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NOTES ON GEOGRAPHIC DISTRIBUTION

First record of *Homolobus infumator* (Lyle, 1914) (Insecta: Hymenoptera: Braconidae: Homolobinae) from Iran

Samira Farahani [1], Ali Asghar Talebi [1*], Ehsan Rakhshani [2] and Cornelis van Achterberg [3]

1 Tarbiat Modares University, Faculty of Agriculture, Department of Entomology. P.O.Box: 14115-336, Tehran, Iran.
2 University of Zabol, College of Agriculture, Department of Plant Protection, Zabol, Iran
3 Naturalis Biodiversity Center, Department of Terrestrial Zoology. Postbox 9517, 2300 RA Leiden, The Netherlands.
* Corresponding author. E-mail: *talebia@modares.ac.ir*

ABSTRACT: Species of the genus *Homolobus* Förster, 1862 in northern Iran were taxonomically studied. The specimens were collected using Malaise traps from March to November of 2010 and 2011. Two species, *Homolobus infumator* (Lyle, 1914) and *Homolobus truncator* (Say, 1829) were collected and identified. The former was recorded for the first time in Iran. Diagnostic characters and geographical distribution of the species are briefly discussed. An illustrated key is provided for identification of the Iranian species.

The Homolobinae van Achterberg, 1979 is a small cosmopolitan subfamily and a heterogeneous group of braconids (van Achterberg 1979), including three genera and about 55 species (Yu *et al.* 2012). This subfamily is easily recognizable by having a deep malar suture and absence of spine at apex of antennae, the presence a distinct antescutellar depression on the pronotum, first metasomal tergite distinctly narrowed behind spiracles and the marginal cell of hind wing widened apically. This subfamily contains three genera in the world, *Exasticolus* van Achterberg, 1979, *Homolobus* Förster, 1862 and *Westwoodiella* Szepligeli, 1904 (Yu *et al.* 2012). The Homolobinae are taxonomically revised in Taiwan (Chou and Hsu 1995), Japan (Maetô 1982b, 1992) and continental China (You *et al.* 1990) resulting in the description of several new species.

The genus *Homolobus* was formerly classified as a member of subfamily Zelinae Ashmead, 1900, together with the genera *Zele* Curtis, 1832 and *Charmon* Haliday, 1833 (van Achterberg 1979). Subsequently, based on the further studies, some species of the genus *Zele* were transferred to the subfamilies Euphorinae Förster, 1862, and Charmontinae van Achterberg, 1979, and the remaining taxa were included in the Homolobinae (Yu *et al.* 2012). *Exasticolus* is restricted to the New World and is distinguished by a comb of spines at the inner apex of the hind tibia and the row of setae on the ventral tarsi (van Achterberg 1979). The genus *Exasticolus* includes six valid species (Yu *et al.* 2012). The genus *Homolobus* contains five subgenera: *Apatia* Enderlein, 1920, *Chartolobus* van Achterberg, 1979, *Homolobus* Förster, 1862, *Phylacter* Reinhard, 1863 and *Oulophus* van Achterberg, 1979. Only the subgenera *Apatia* and *Chartolobus* are known to occur in Iran. The subgenus *Apatia* differs from *Chartolobus* in the having tarsal claw simple, and vein 1A+2A of fore wing straight basally. The genus *Homolobus* contains now 55 species (Yu *et al.* 2012).

The biology of the genus *Homolobus* species has been reviewed by van Achterberg (1979), Maetô (1982a), You *et al.* (1990), Shaw and Huddleston (1991) and Papp (1994). This genus contains solitary koinobiont, and at least initially, endoparasitoids of Lepidopterous larvae (Yu *et al.* 2012). Allen (1982) reported a final obligate ectoparasitic feeding phase in *Homolobus infumator*, and this is believed to be common to all species (Shaw and Huddleston 1991). Noctuidae and Geometridae are the most frequently recorded hosts of *Homolobus* species (van Achterberg 1979, Shaw and Huddleston 1991, Shaw 2010). Many species are mainly and rather frequently collected by light traps (van Achterberg 1979, Yu *et al.* 2012).

The Iranian fauna of Braconidae is very rich in species but very poorly studied. Northern Iran is characterized by a great diversity in vegetation, natural ecosystems and farm lands due to significant differences in the topography and varied climate. Two species of the subfamily Homolobinae, *Homolobus* (*Apatia*) *ophioninus* (Vachal, 1907) and *H.* *(A.) truncator* are previously reported from Iran (van Achterberg 1979, Ghahari *et al.* 2009). A new record of the genus *Homolobus* (*Chartolobus*) from Iran is presented below.

Material for this study was collected from different habitats of northern Iran during March to November of 2010 and 2011 using Malaise traps. The specimens were taken from the traps at weekly intervals. After that, they were transferred to 96% ethanol for five minutes, followed by a soak in hexamethyldisilazane (HMDS) for 30 min and finally placed on a glass plate to dry. The dried specimens were card-mounted and labeled. Identifications were performed using the keys by van Achterberg (1979, 1992, 1993). The photographs were taken using an Olympus AX70 microscope and an Olympus SZX9 stereomicroscope equipped with a Sony CCD digital camera. Morphological terminology follows van Achterberg (1993). All specimens are deposited in the insect collection of the Department of Entomology, Tarbiat Modares University, Tehran.

A total of 177 and 4 specimens of *Homolobus truncator* and *H. infumator* , respectively, were collected from the studied area. *Homolobus infumator* (Lyle, 1914) is recorded here for the first time from Iran.

Key to Iranian species of the genus *Homolobus* Förster

1. Tarsal claws with a distinct acute basal lobe, generally tooth-like (Figure 1H). Vein 1A + 2A of fore wing curved (Figure 1D). Inner side of basal segments of flagellum with longitudinal keel (Figure 1I). ..... ***H. infumator***

1'. Tarsal claws simple (Figure 2H). Vein 1A + 2A of fore wing straight (Figure 2D). Inner side of basal segments of flagellum without longitudinal keel (Figure 2I). **2**

2. Eye about 1.6 times as long as temple in dorsal view. Fourth labial palp segment 4–5 times as long as third one (Figure 2G). ..... ***H. truncator***

2'. Eye about 2.3 times as long as temple in dorsal view. Length of maxillary palp equal to height of head. Fourth labial palp segment 3 times as long as third one. ..... ***H. ophioninus***

***Homolobus* (*Chartolobus*) *infumator* (Lyle, 1914) (Figures 1A-I)**

Material examined: GUILAN - Roodsar, Orkom (36°45'44.34" N 50°18'11.88" E, 1201 m asl), 10-X-2010, 1♀; MAZANDARAN - Noor, Gaznasara (36°16'56.82" N 52°10'58.50" E, 2032 m asl), 06-VI-2011, 2♀♀; MAZANDARAN- Noor, Joorband (36°26'15.54" N 52°07'13.50" E, 275 m asl), 04-XI-2011, 1♀, leg.: A. Nadimi.

Diagnosis (Female): Length of body 8–10 mm (Figure 1A). Fourth and fifth maxillary palp segments almost equal in length (Figure 1F). Second and fourth labial palp segments 2 and 3.5 times as long as third segment, respectively (Figure 1G). Eyes about 1.6 times as long as temple, in dorsal view. Face slightly wider than high (Figure 1E). Vein 2A of the fore wing present basally. Anal area bare (Figure 1B, 1D). Vein r of hind wing absent; vein SC+R1 and SR veins strongly curved (Figure 1C). Length of first metasomal tergite 2.4 times its apical width. Tarsal claws with distinct lobe (Figure 1H).

Biology: Host records of *H. infumator* include three different families, but the majority of the hosts belong to the family Geometridae and rarely Lasiocampidae and Oecophoridae (Yu *et al.* 2012, Shaw 2010).

General distribution: Holarctic, Neotropical and Oriental (Yu *et al.* 2012). New record from Iran.

***Homolobus* (*Apatia*) *truncator* (Say, 1829) (Figures 2A-I)**

Material examined: QAZVIN - Zereshk (36°21'39.72" N 50°03'55.26" E, 1541 m asl), 29-IV-2011, 1♀; 09-V-2011, 2♀♀; 08-VI-2011, 2♀♀, 3♂♂; 21-VI-2011, 9♀♀, 56♂♂; 25-VII-2011, 1♀; 15-VIII-2011, 1♀; 26-IX-2011, 1♀; 10-X-2011, 1♀; QAZVIN - Zereshk (36°25'39.36" N 50°06'36.90" E, 1997 m asl), 25-VII-2011, 1♀, 1♂; 15-VIII-2011, 1♀; 26-IX-2011, 1♀; QAZVIN - Loshan (36°40'14.58" N, 49°25'38.52" E, 295 m asl), 09-V-2011, 1♀, 1♂; 24-V-2011, 1♀; 21-VI-2011, 1♀; 10-X-2011, 1♀; MAZANDARAN - Noor, Joorband (N 36°26'15.54" , E 52°07'13.50" , 275 m asl), 14-VI-2011, 1♀; 25-VII-2011, 1♀; MAZANDARAN - Noor, Gaznasara (36°16'51.42" N 52°10'55.62" E, 2013 m asl), 06-VI-2011, 1♀; MAZANDARAN - Noor (36°34'52.98" N 52°02'45.78" E, -14 m bsl), 04-XI-2011, 3♀♀; GUILAN - Astaneh Ashrafiyeh, Eshman Komachal (37°22'03.66" N 49°57'57.84" E, -1 m bsl), 03-X-2010, 2♀♀, 1♂; 10-X-2010, 1♀; 17-X-2010, 1♀, 1♂; GUILAN - Roodsar, Ziaz (36°52'34.44" N 50°13'17.40" E, 537 m asl), 21-VI-2010, 1♀; ALBORZ - Karaj (35°46'08.55" N 50°56'55.20" E, 1277 m asl), 19-IV-2010, 2♀♀,2♂♂; 03-V-2010, 1♀; 10-V-2010, 1♀; 17-V-2010, 2♀♀, 2♂♂; 24-V-2010, 1♂; 31-V-2010, 2♀♀; 07-VI-2010, 1♀; 05-VII-2010, 1♀; 13-VII-2010, 1♀; 19-VII-2010, 2♀♀; 2-VIII-2010, 1♀; 15-VIII-2010, 1♀; 23-VIII-2010, 1♀; 04-X-2010, 2♀♀, 2♂♂; 18-X-2010, 1♀, 2♂♂; 25-X-2010, 1♂; 06-IX-2010, 2♀♀; 13-IX-2010, 1♀, 1♂; 20-IX-2010, 2♀♀; 27-IX-2010, 3♀♀;1-XI-2010, 1♂; 12-X-2010, 1♀, 2♂♂; 18-X-2010, 3♀♀, 1♂; 25-X-2010, 4♀♀; ALBORZ - Shahriar (35°40'08.10" N 50°56'56.64" E, 1168 m asl), 19-IV-2010, 1♀; 25-IV-2010, 1♀, 1♂; 03-V-2010, 2♀♀; 17-V-2010, 1♀; 24-V-2010, 4♀♀; 21-VI-2010, 1♀; 27-VII-2010, 1♀; 06-IX-2010, 1♀; 13-IX-2010, 2♀♀, 1♂; 27-IX-2010, 2♀♀; 04-X-2010, 3♀♀; 12-X-2010, 1♀; 18-X-2010, 2♀♀, 1♂; 25-X-2010, 2♀♀, 1♂; leg. M. Khayrandish.

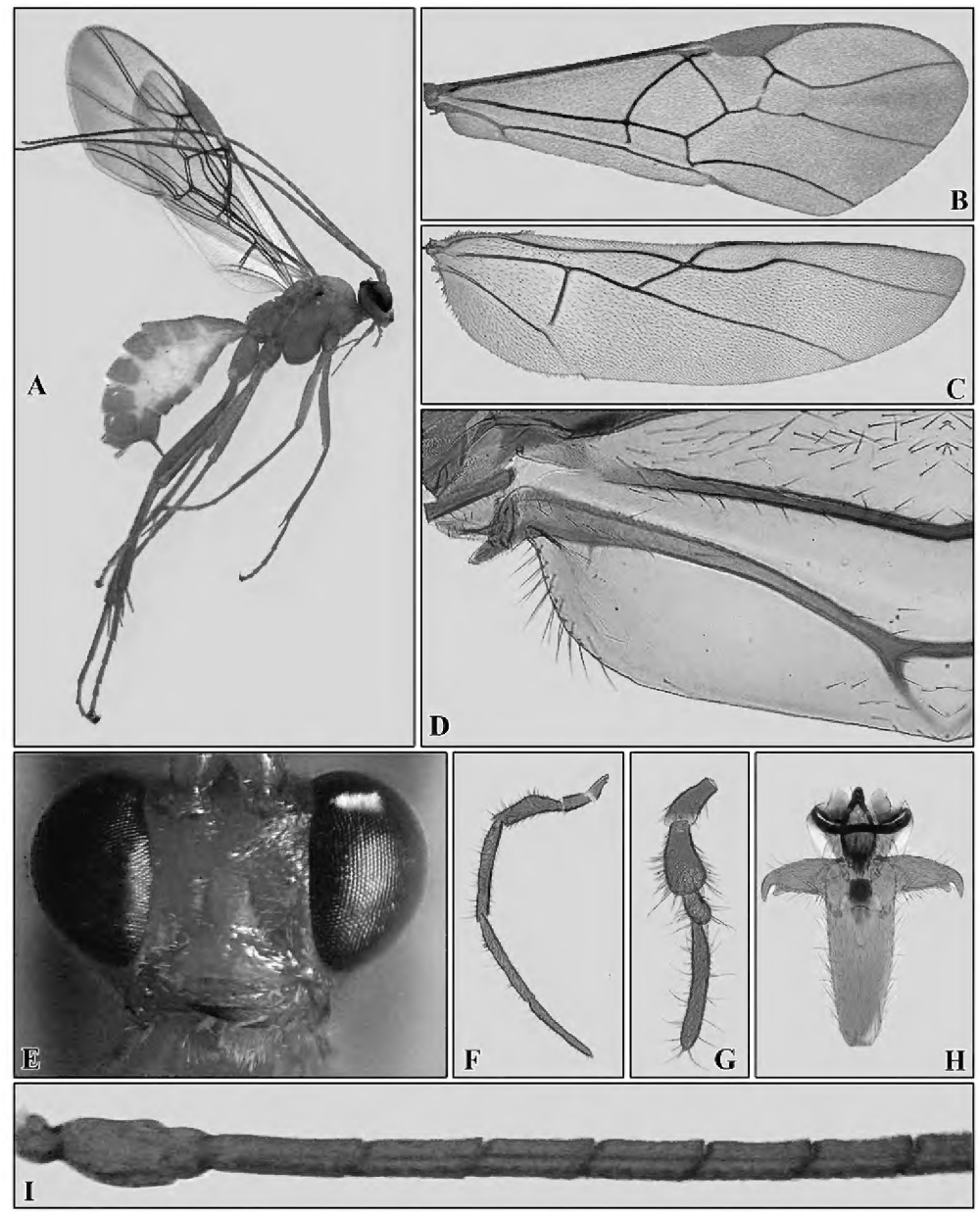

FIGURE 1. *Homolobus infumator* (Lyle, 1914): A. Habitus, lateral view , B. Fore wing, C. Hind wing, D. Basal part of fore wing, E. Frontal view of head, F. Maxillary palp, G. Labial palp, H.- Tarsal claw, I. Basal segments of antenna.

Diagnosis (Female): Length of body 6–7 mm (Figure 2A). Fifth maxillary palp segment 1.14 times as long as fourth segment (Figure 2F). Second and fourth labial palp segments about 4 and 5 times as long as third segment, respectively (Figure 2G). Eye 1.3 times as long as temple in dorsal view. Face distinctly wider than high (Figure 2E). Vein 2A of fore wing present; anal area sparsely setose (Figure 2B, 2D). Vein r of hind wing absent; SC+R1 and SR slightly curved (Figure 2C). Length of first metasomal tergite 3.1–3.2 times its apical width. Tarsal claws simple and without lobe (Figure 2H).

Biology: *H. truncator* is most commonly recorded as a

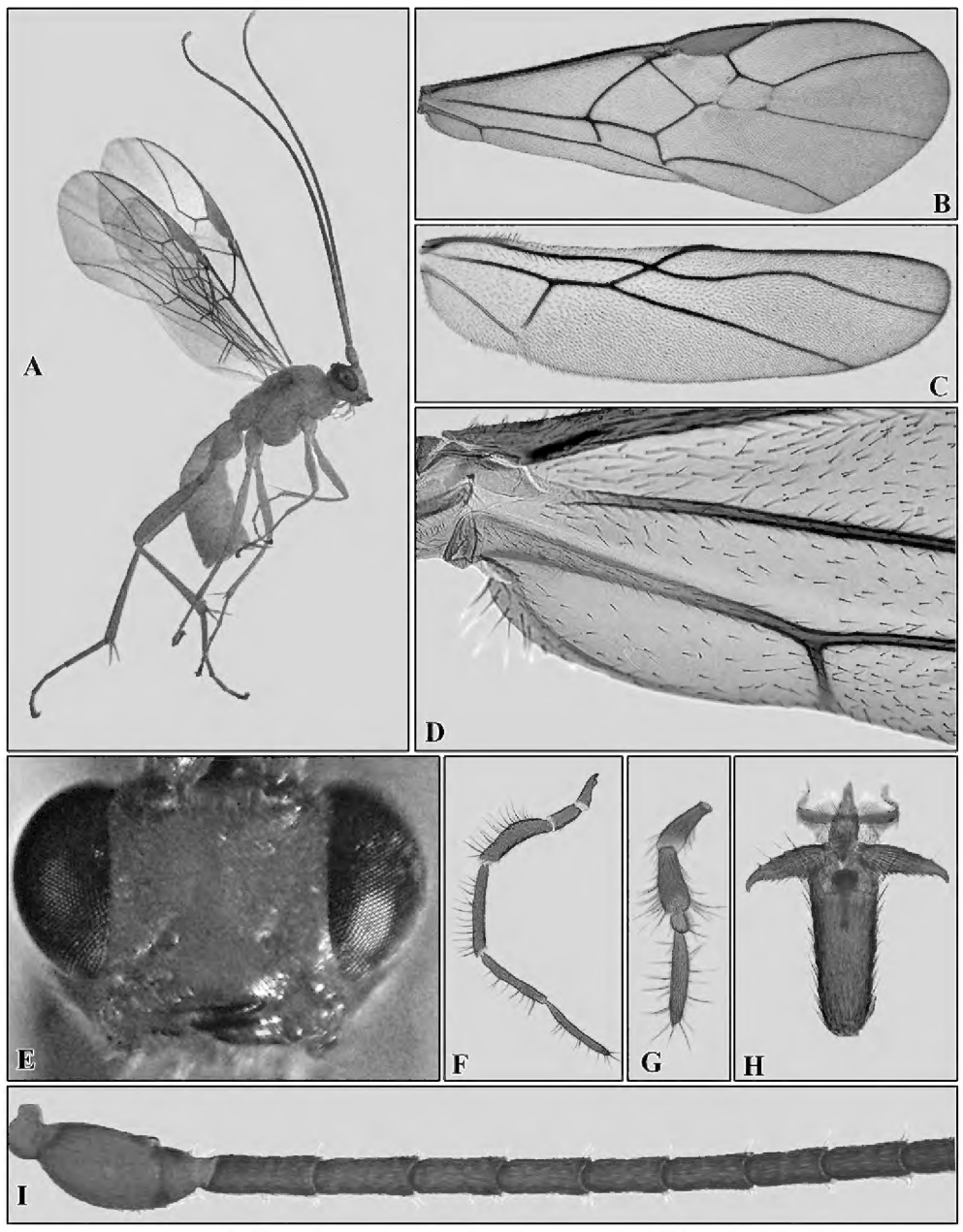

FIGURE 2. *Homolobus truncator* (Say, 1829): A. Habitus, lateral view, B. Fore wing, C. Hind wing, D. Basal part of fore wing, E. Frontal view of head, F. Maxillary palp, G. Labial palp, H.- Tarsal claw, I. Basal segments of antenna.

parasitoid of Noctuidae and Geometridae larvae, but also rarely of Lasiocampidae, Crambidae and Gelechiidae (Yu *et al.* 2012, Shaw 2010).

General distribution: Holarctic, Afrotropical, Neotropical and Oriental (Yu *et al.* 2012). Previously recorded from Iran by van Achterberg (1979) and Ghahari *et al.* (2009).

The genus *Homolobus* is a moderately small group, but it has a worldwide distribution (van Achterberg 1979; Wharton 1997). The first record of Iranian Homolobinae was reported by van Achterberg (1979). Recently, *H. truncator* was reported by Ghahari *et al.* (2009) in East Azarbaijan province of Iran. In our study, *Homolobus truncator* was a particularly widespread and abundant species. The period of flight seems to be from the middle of April to the end of October. It is distributed in Holarctic, Neotropical and Oriental regions, while *H. ophioninus* is distributed in Afrotropical, Palaearctic and Australian regions (van Achterberg 1979). It was previously recorded from Iran (Fars province, Beshneh) by van Achterberg (1979).

Among the neighbouring countries, the records of Turkish Homolobinae are still restricted to *H. infumator* and *H. truncator* (van Achterberg 1979, Papp 1994), but another species, *Homolobus truncatoides* van Achterberg, 1979 has been recorded from Iraq (van Achterberg 1979). Furthermore, some other species of the genus *Homolobus* including *H. annulatus* van Achterberg, 1979, *H. annulicornis* (Nees, 1834), *H. bohemani* (Bengtsson, 1918), *H. carbonator* (Shestakov, 1940), *H. dauricus* Shastakov, 1940, *H. discolor* (Wesmael, 1833), *H. flagitator* (Curtis, 1837) and *H. rufiventralis* Maeto, 1982 have been reported by van Achterberg (1979) and Belokoblyskij (1998) from Russia. Iran is a large country, incorporating various geographical regions and climates, indicating a need for further studies. We expect that still part of Homolobinae species from Iran remain to be discovered.

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